



US005925972A

# United States Patent [19]

[11] Patent Number: **5,925,972**

Shrader et al.

[45] Date of Patent: **Jul. 20, 1999**

[54] **MULTIPLE ELEMENT PARTICLE SENSOR AND SIGNAL PROCESSING ELECTRONICS**

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[21] Appl. No.: **08/721,964**

[22] Filed: **Sep. 27, 1996**

[51] **Int. Cl.**<sup>6</sup> ..... **H01L 41/113**

[52] **U.S. Cl.** ..... **310/338; 310/319**

[58] **Field of Search** ..... 310/319, 324, 310/330-332, 338

### [57] ABSTRACT

A sensor device adapted to detect at least one of a particle and a bubble in a fluid, includes a fluid nozzle defining a center of fluid flow; and a plurality of sensor elements for converting an impact of one of a particle and a bubble into an electrical signal, wherein a first sensor element is arranged closer to the center of fluid flow than a second sensor element. The sensor device includes a number of diaphragm sensor elements each having a sufficiently small mass for responding to a collision with the particle, and an apparatus for converting a vibration of the diaphragm portion into an electrical signal so as to detect the vibration. The multiple elements are arranged in the fluid flow stream such that different size particles will preferentially strike different elements.

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**13 Claims, 9 Drawing Sheets**

